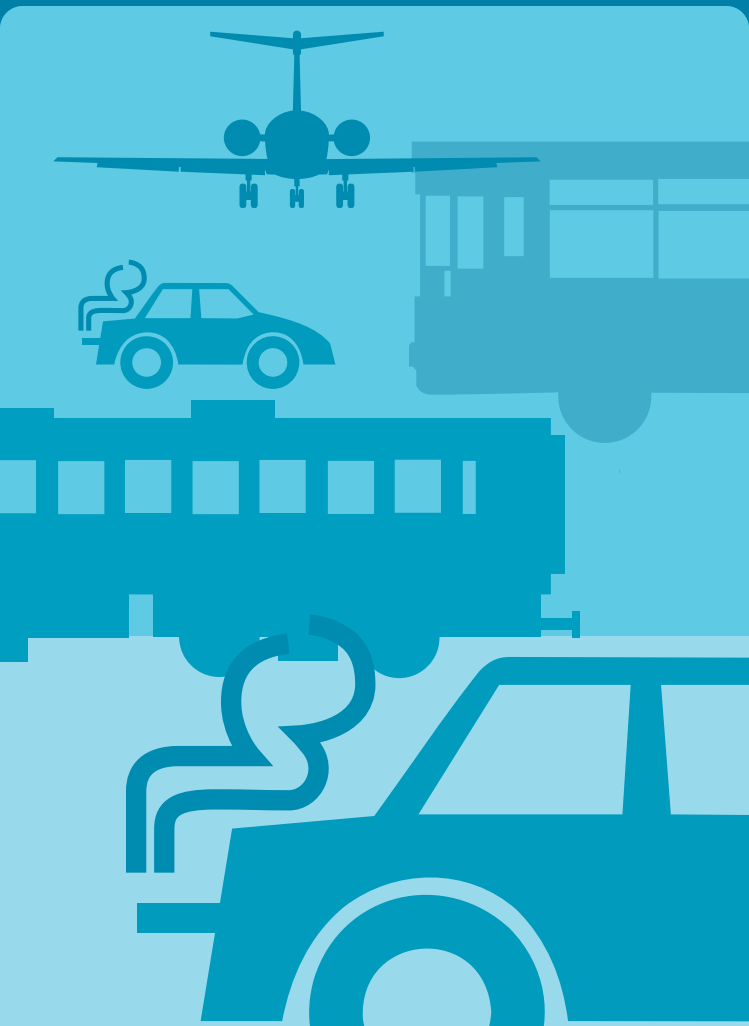


Managing Transport Noise in Cities

Noise Mapping and Action Planning



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We all enjoy the benefits of mobility that access to travel by road, rail and air give us, and have to accept that there will sometimes be unwelcome effects like noise. Most of us hear transport noise at some time during the day and night – and with increased traffic levels on roads, rail and in the air some areas are experiencing more noise – which is reaching levels that could affect our quality of life and health. The European Union (EU) has adopted legislation which aims to avoid, prevent or reduce, on a prioritised basis, harmful effects due to exposure to environmental noise – this is the Environmental Noise Directive (END). In England the Department for Environment, Food and Rural Affairs (Defra) is responsible for implementing the END. Defra are working towards measures to manage the impact of transport noise. This includes coordinating with other relevant authorities and consulting the public on draft noise action plans.

Why Do We Need to Reduce Transport Noise?

Noise can disrupt communication, disturb sleep and generally affect our quality of life. It is estimated that 67 million Europeans are regularly exposed to road noise levels considered potentially harmful to health; a report commissioned by the Greater London Authority estimates that up to 108 heart attacks a year in London could be caused by exposure to road traffic noise.

European Laws

The Environmental Noise Directive 2002/49/EC (END) aims to “avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise”; it has been transposed into the Environmental Noise (England) Regulations 2006 (as amended). Three key requirements of the Directive and the Regulations are to:

- Prepare strategic noise maps for large urban areas (referred to as agglomerations in the Directive), major roads, major railways and major airports.
- Prepare action plans based on the results of the noise mapping with the intention that these plans will aim to manage and reduce, where necessary, environmental noise, and preserve environmental noise quality where it is good in agglomerations (so-called ‘quiet areas’).
- Make information available to the public and facilitate public participation in the process.

Environmental noise as defined by the Environmental Noise Directive is noise from transport and some industrial sources. The Directive addresses the overall impact of transport noise rather than noise from individual vehicles (other regulations cover this – see our Noise Pollution leaflet).

What Can We Do About Transport Noise?

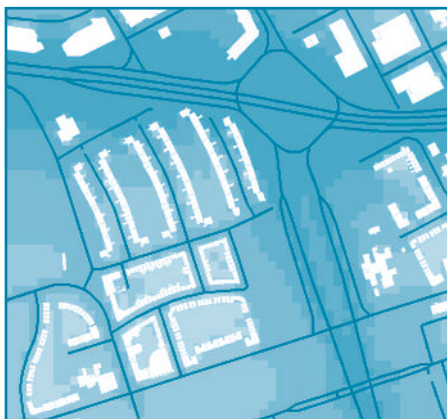
Managing transport noise is a large and complex task. The END requires that noise action plans address priority areas. Strategic noise maps are being used as a first step in identifying these. There are many ways in which the impact of transport noise on people can be reduced (some examples are listed at the end of this leaflet).

Assessing Exposure – Strategic Noise Mapping

Before we can work towards managing exposure to noise we have to find out where the worst problems are by assessing transport noise and estimating the number of people exposed to different noise levels.

What is a Strategic Noise Map?

Strategic noise maps are produced using computer software that calculates noise levels from information on traffic flows, rail movements, aircraft movements and industries. It also takes account of the topography (ground levels/building heights) of an area. Computer modelling is used as noise measurement would be prohibitively expensive and could not, over the course of a year, practically cover the large areas and numbers of buildings required to comply with the END. It would also be technically difficult to isolate different noise sources. The maps are contour maps showing areas of differing levels of noise at a height of 4 metres above ground level, for an average day in the year for individual noise sources – i.e. road traffic, railway



You can see the noise maps for England at <http://www.defra.gov.uk/noisemapping>

traffic, aircraft in flight or industry. For urban areas these can be combined into one map to try and give an overall picture of the noise climate.

The main indicator used to describe the noise levels on the maps is L_{den} , expressed in A-weighted decibels – dB(A). The L_{den} is a combined indicator, based on an annual average 24 hour period, and calculated from the average A-weighted sound pressure levels for the **d**ay, **e**vening and **n**ight periods. A-weighting is an adjustment that takes account of the way the human ear hears different frequencies (pitches) of sound. The default time periods used in L_{den} are:

L_{day} - Day, 7am - 7pm

L_{eve} - Evening, 7pm - 11pm

L_{night} - Night, 11pm - 7am

When calculating L_{den} , 5 dB is added to L_{eve} and 10 dB is added to L_{night} to try to reflect increased sensitivity to noise at these times.

English Noise Maps

A rolling programme of mapping is being undertaken, with the areas where most people are likely to be affected by most noise covered first. These are:

- Large, densely populated urban areas – over 250,000 people with a population density of more than 500 people per km².
- Areas around roads with more than six million vehicle passages a year.
- Areas around railways with more than 60,000 train passages a year.
- Areas around airports with more than 50,000 movements a year.

The large, densely populated areas of England that have been mapped so far are:

Blackpool, Bournemouth, Brighton, Bristol, Coventry, Hull, Leicester, Liverpool Birkenhead, London, Manchester, Nottingham, Portsmouth, Preston, Reading, Sheffield, Southampton, Southend, Teesside, The Potteries, Tyneside, West Midlands, West Yorkshire.

It should be noted that many of the areas mapped extend beyond city boundaries and may therefore cover more than one local authority area.

Airports mapped so far are:

Birmingham International, Blackpool Squire's Gate, Bournemouth, Bristol Lulsgate, Coventry, Leeds Bradford, Liverpool John Lennon, London City, London Gatwick, London Heathrow, London Luton, London Stansted, Manchester International, Newcastle International, Nottingham East Midlands, Shoreham, Southampton Eastleigh, Southend.

In the second round, due to be reported to the European Commission in 2012, the following must be mapped:

- Urban areas with a population of 100,000 people.
- Areas around roads with more than 3 million vehicle movements.
- Areas around railways with over 30,000 train movements.
- Areas around airports with more than 50,000 movements a year.

Urban areas currently scheduled to be included are:

Barnsley, Basildon, Blackburn, Burnley, Cambridge, Cheltenham, Chesterfield, Crawley, Derby, Doncaster, Farnborough, Gillingham, Gloucester, Grimsby, Hastings, High Wycombe, Ipswich, Luton, Mansfield, Margate, Milton Keynes, Northampton, Norwich, Oxford, Peterborough, Plymouth, Slough, Southport, St Albans, Sunderland, Swindon, Telford, Torquay, Warrington, Wigan, York.

(If populations alter significantly by 2010 areas mapped may change.)

What is the Purpose of Strategic Noise Maps?

The purpose of strategic noise maps is:

- To enable the assessment of the exposure of population to noise – by linking population data to the noise levels on the maps.
- To assist in the identification of areas that have good environmental noise quality ('quiet areas').
- To inform the development of action plans to manage the exposure of populations to noise, including reduction if necessary, and, in urban areas, prevent locations of existing quiet from becoming noisy.
- To raise public awareness and engage everyone affected in the development of noise action plans.

Noise maps do not account for individual noisy incidents, and are not a precise measurement of noise. What they give is an indication of the areas that are affected by various levels of

environmental noise, and of the areas that are relatively quiet, based on the input data. When interpreting the maps to inform the management and/or reduction of noise at local level, local knowledge will be needed to ensure all factors are considered.

What do Noise Maps Mean?

If you live in an area mapped for environmental noise, remember that the noise levels on the maps are a model of the average noise level, outdoors, on an average day in an average year – not actual noise levels at any given place or time. The maps will be used to help in planning to manage noise. In looking at areas that may potentially need to be managed for noise, all characteristics of the area will need to be taken into account.

Noise Action Planning

Now that the first noise maps have been produced, Government are working on the first noise action plans. Managing transport noise is a long term process – there are no instant solutions.

There will be separate plans for major road and rail networks identifying areas for further analysis and, where appropriate, the development of measures to manage noise, including noise reduction if necessary, over the five year life of the action plans. Similar plans will be drawn up for each of the mapped urban areas, which will also include measures that aim to protect those open spaces providing significant and important benefits because they are quiet. Separate plans for each airport currently mapped are being drawn up by the airport operators. All plans are subject to a formal public consultation before submission to the European Commission.

How Can the Impact of Transport Noise be Reduced?

There are many ways in which the noise we hear from transport can be reduced. For aircraft, vehicles and train rolling stock, international standards cover the noise from individual vehicles and some components. Other ways noise can be managed are through looking at how, when and where transport is operated (noise has a greater impact at night). Below are some of the measures that can potentially be used in noise action planning:

1. Speed

For road traffic, reducing speed reduces noise from engines, acceleration and tyres on roads. Sticking to speed limits and lowering speed limits (and ensuring they are enforced) can mean less noise. Managing speed on railways can also reduce noise. Speed restrictions need to be balanced against the impact of increased journey times.

2. Night Time Restrictions

Rerouting heavy lorries away from noise sensitive areas – especially at night – reduces peak noise incidents and therefore potential sleep disturbance. Similarly, restrictions on night flights in and out of airports reduces sleep disturbance, and train horns should not be sounded at night, except in emergencies.

3. Quieter Buses

Modern buses are generally much quieter than older vehicles. Renewing vehicle fleets generally means quieter and cleaner vehicles.

4. Quiet Traffic Calming

Traffic calming is designed to reduce speed – which in theory should reduce noise. However, poorly designed speed humps and chicanes, together with inappropriate driving style can increase noise as drivers brake and accelerate. Measures which encourage smoother driving, such as mini roundabouts and interactive speed signs are more successful.

5. Noise Barriers

These are expensive and can be unattractive, but where a major road or railway runs close to homes noise barriers could be the best option. Their size and composition are determined by location (and cost). Tunnels shield noise but are very expensive to construct.

6. Sound Insulation

Where buildings are exposed to noise, double glazing can be used to reduce the level of noise reaching the inside. This means alternative ventilation methods must be in place so that windows can be kept closed. Also, buildings should be designed to ensure that the most sensitive rooms – such as bedrooms – are on the quietest facade of the building.

7. Quieter Transport Routes

Measures to maintain and improve the quality of road surfaces can reduce noise. Poorly maintained roads and those that have been dug up and patched by utility companies can be noisy. Quieter road surfaces are available but some types can be expensive. In 2007/08 the Highways Agency resurfaced just over 1000 lane km in England with quiet surfaces. For railways, ensuring tracks are well maintained should help minimise noise.

8. Traffic Management

Keeping traffic away from people reduces the noise impact – for example park and ride schemes, pedestrianisation and car free housing areas. Designing urban streets to encourage

slower, smoother driving and ensuring smooth traffic flows helps. When flight paths are reviewed noise impact on populations and existing quiet areas should be considered. For rail, noise mitigation should be built into any new routes.

9. Vehicles

Vehicles themselves make noise – engines, exhausts, acceleration and braking. At speeds of around 20mph on congested city streets engine noise may dominate. Although there are European standards for vehicle noise – the trend for bigger noisier vehicles and more traffic means noise has increased in some areas. Work is underway towards tighter standards but progress is slow. However, quiet electric and hybrid vehicles have concerned cyclists and pedestrians who can't hear them coming – and some manufacturers are researching 'acceptable' noises for these!

10. Tyres

Rolling noise from the contact between tyres and road surfaces is a major source. An increasing body of research shows that reducing tyre noise is more cost effective than noise barriers and sound insulation. Although quieter tyres are available, heavier, faster vehicles need heavier duty and consequently noisier tyres. EU regulations on tyre noise and noise labelling for tyres will have some impact as will encouraging fleet operators and drivers to choose quieter tyres.

11. Aircraft

There are international noise standards for aircraft, with an ongoing programme for noise reduction.

12. Train Wagons

For trains, newer wagons are quieter, and EU incentives are planned for rail companies to retrofit wagons to reduce noise.

What Can You Do?

Some measures to reduce transport noise require changes in international and national laws, and in the planning and operation of transport systems. However, as transport users we can all make a contribution to reducing noise. Most measures that reduce noise also reduce air pollution and are better for our health and the quality of the local environment, and some reduce fuel use and save money.

- Walk or cycle for short journeys
- Use public transport
- Stick to speed limits
- Keep vehicles well maintained – this will save fuel too
 - keep silencers in good order
 - check brakes are properly adjusted
- Drive smoothly
- Don't rev the engine
- Turn off the engine when stationary
- Keep the music down
- Don't slam doors or sound the horn unnecessarily
- Choose quieter tyres

Further Information

Noise maps England:

www.defra.gov.uk/noisemapping

Noise maps Scotland:

www.scottishnoisemapping.org

Noise maps Northern Ireland:

www.noiseni.co.uk

Noise maps Wales:

www.wales.gov.uk/topics/environmentcountryside/epq/noiseandnuisance/environmentalnoise

EU on noise action plans

www.ec.europa.eu/environment/noise



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- **Neighbour Noise**
- **Car Pollution**
- **Small Scale Wind Turbines**
- **Air Pollution**

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